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09/915,650	07/26/2001	Nassir Navab	2000P07791US01	7995

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Siemens Corporation
Intellectual Property Department
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EXAMINER

CHOW, JEFFREY J

ART UNIT	PAPER NUMBER
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2628

DATE MAILED: 08/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/915,650

Applicant(s)

NAVAB ET AL.

Examiner

Jeffrey J. Chow

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 46-62 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 46-62 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1 – 45 have been considered but are moot since these claims have been cancelled.

Applicant argues that Harrington does not disclose “producing the augmented reality video by rendering the three-dimensional image data model of the product superimposed on the moving model plane in that video data and having the pose of the moving model plane”. Harrington further discloses the unprojection module 82 that projects three-dimension object onto a two-dimensional viewing plane, where a two dimensional image results from the three dimensional object and the unprojection step comprises the mathematical calculation comprising taking a two-dimensional image and determining what three-dimensional object could have created that two-dimensional image with respect to what the object can be and where it could have been positioned and the subject invention utilizes known dimensions with regard to the camera system and viewing plane, in combination with assumed characteristics of the piece of paper (column 7, lines 28 – 53).

The specification objections have been withdrawn due to applicant's amendments.

The abstract objection has been withdrawn due to applicant's amendments.

The 35 U.S.C. 112 rejections have been withdrawn due to the cancellation of claims 1 – 45.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(f) he did not himself invent the subject matter sought to be patented.

Claims 46 – 48, 52 – 56, and 60 are rejected under 35 U.S.C. 102(e) as being anticipated by Harrington (US 6,898,307).

Regarding to independent claim 46, Harrington discloses a camera 12 that captures the normal field of view of the user of the headset 10 that is substantially what the user would see without the headset 10 (column 4, lines 4 – 24) and the analog signal from the camera 12 is converted to a digitized frame that can be stored in the computer 18 for analysis (column 4, lines 25 – 38) and the computer 18 must interpret the captured video frames to locate a piece of paper within the camera view (column 4, lines 38 – 67 and column 5, lines 1 - 34) and the preselected movable real object comprises a reference panel such as a screen, tablet or piece of paper and the identifying includes recognizing a corner of the panel (claim 2), which reads on the claimed providing video data comprising images of a moving model plane having markers. Harrington further discloses the unprojection module 82 that projects three-dimension object onto a two-dimensional viewing plane, where a two dimensional image results from the three dimensional object (column 7, lines 28 – 53), which reads on the claimed providing a three-dimensional

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image data model of a product. Harrington also discloses the unprojection step comprises the mathematical calculation comprising taking a two-dimensional image and determining what three-dimensional object could have created that two-dimensional image with respect to what the object can be and where it could have been positioned and the subject invention utilizes known dimensions with regard to the camera system and viewing plane, in combination with assumed characteristics of the piece of paper (column 7, lines 28 – 53), which reads on the claimed determining a pose of the moving model plane according to the markers in the video data and the claimed determining an image correspondence between the moving model plane having markers and the three-dimensional image data model. Harrington discloses the camera provide the computer with the same view that the user sees so that the synthetic image is displayed or superimpose in a manner for comfortable and convenient interaction between the real reference item within the field of view that the user may be holding and manipulating (column 4, lines 4 – 37), which reads on the claimed producing the augmented reality video by rendering the three-dimensional image data model of the product superimposed on the moving model plane in the video data.

Regarding independent claim 54, claim 54 is similar in scope as to claim 46, thus the rejection for claim 46 hereinabove is applicable to claim 54.

Regarding dependent claim 47 and 55, Harrington discloses the user could select as the application image a particular internet browser engine which, based upon the located orientation of the piece of paper, would be transformed to exactly match the detected orientation of the piece of paper so that the displayed image provides the illusion of the web page actually appearing on the blank piece of paper being held by the user and once the position of the paper page is

determined, information can be used to correctly distort the application's image so it overlays the paper in the eyes of the user (column 5, lines 4 – 35) and the unprojection step comprises the mathematical calculation comprising taking a two-dimensional image and determining what three-dimensional object could have created that two-dimensional image with respect to what the object can be and where it could have been positioned and the subject invention utilizes known dimensions with regard to the camera system and viewing plane, in combination with assumed characteristics of the piece of paper (column 7, lines 28 – 53), which reads on the claimed rendering of the three-dimensional image data model has substantially the pose of the moving model plane.

Regarding dependent claims 48 and 56, Harrington discloses the translation, rotation, scaling and perspective operations can be applied to the image using standard image processing methods, or specialized textual mapping hardware may be employed for improving processing speed (column 5, lines 26 – 35) and the unprojection step comprises the mathematical calculation comprising taking a two-dimensional image and determining what three-dimensional object could have created that two-dimensional image with respect to what the object can be and where it could have been positioned and the subject invention utilizes known dimensions with regard to the camera system and viewing plane, in combination with assumed characteristics of the piece of paper (column 7, lines 28 – 53), which reads on the claimed scaling the three-dimensional image data model to the model plane according to the markers.

Regarding dependent claims 52 and 60, Harrington discloses the user could select as the application image a particular internet browser engine which, based upon the located orientation of the piece of paper, would be transformed to exactly match the detected orientation of the piece

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of paper so that the displayed image provides the illusion of the web page actually appearing on the blank piece of paper being held by the user (column 5, lines 15 – 22), which reads on the claimed video data includes images of a human manipulating the pose of the model plane, wherein a rendering of the three-dimensional image model is manipulated according to the pose of the model plane.

Regarding dependent claim 53, Harrington discloses the information analysis and image preparation need be accomplished in essentially real-time for the image display to appear as real as possible to the user (column 5, lines 32 – 35), which reads on the claimed wherein the augmented reality video is produced in real time.

Claims 49 and 57 rejected under 35 U.S.C. 102(f) because the applicant did not invent the claimed subject matter.

Regarding dependent claims 49 and 57, Navab discloses FIG. 6 shows a color cube augmented on top of the model plane using OpenGL rendering with a fake shadow in accordance with the principles of the present invention (paragraph 12). Navab did not disclose any other mention of providing shades or shadows in the disclosed specification. Applicant admitted that the fake shadow was made using OpenGL.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 49 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US 6,898,307) in view of Navab et al. (US AN 09/915650).

Regarding dependent claims 49 and 57, Harrington did not expressly disclose adding shadow to the three-dimensional image data model on the model plane. Navab discloses FIG. 6 shows a color cube augmented on top of the model plane using OpenGL rendering with a fake shadow in accordance with the principles of the present invention (paragraph 12). It would have been obvious for one of ordinary skill in the art at the time of the invention to modify Harrington's system by using OpenGL to incorporate fake shadow. One would be motivated to do so to provide realistic effects in an Augmented Reality environment.

Claims 50, 51, 58, 59, 61, and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (US 6,898,307) in view of Rhoads et al. (US 7,050,603).

Regarding to independent claim 62, Harrington discloses a camera 12 that captures the normal field of view of the user of the headset 10 that is substantially what the user would see without the headset 10 (column 4, lines 4 – 24) and the analog signal from the camera 12 is converted to a digitized frame that can be stored in the computer 18 for analysis (column 4, lines 25 – 38) and the computer 18 must interpret the captured video frames to locate a piece of paper within the camera view (column 4, lines 38 – 67 and column 5, lines 1 - 34) and the preselected movable real object comprises a reference panel such as a screen, tablet or piece of paper and the identifying includes recognizing a corner of the panel (claim 2), which reads on the claimed providing video data comprising images of a moving model plane having markers. It is inherent

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that a piece a paper, screen, or tablet is substantially rectangular, which reads on the claimed model plane is a substantially rectangular plane. Harrington discloses marker is a corner of the panel (claim 2) and a piece of paper can be identified by its white color against a darker background (column 4, line 55 – column 5, line 3), which reads on the claimed marker is a graphic disposed on an upper surface thereof. Harrington further discloses the unprojection module 82 that projects three-dimension object onto a two-dimensional viewing plane, where a two dimensional image results from the three dimensional object (column 7, lines 28 – 53), which reads on the claimed providing a three-dimensional image data model of a product. Harrington did not expressly disclose the three-dimensional image data model is an animation. Rhoads discloses watermarks may be embedded in two dimensional image renderings or still or animated 3D graphical objects and the embedded object can be composited with a video stream to form a video program, such as a movie or television program and graphical objects that link to information or electronic commerce transactions can be added to a video product, such as a movie, when its converted from one format to another (column 18, lines 5 – 18). It would have been obvious for one of ordinary skill in the art at the time of the invention to modify Harrington's system by projected 3D animated objects as expressed in Rhoads. One would be motivated to do so because 3D animated objects are used in many commonly used applications such as games (column 18, line 63 – column 19, line 5) or interactive shopping (column 20, lines 41 – 48) that provide users a more convincing virtual environment. Harrington further discloses the unprojection step comprises the mathematical calculation comprising taking a two-dimensional image and determining what three-dimensional object could have created that two-dimensional image with respect to what the object can be and where it could have been

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positioned and the subject invention utilizes known dimensions with regard to the camera system and viewing plane, in combination with assumed characteristics of the piece of paper (column 7, lines 28 – 53), which reads on the claimed determining a pose of the moving model plane according to the markers in the video data and the claimed determining an image correspondence between the moving model plane having markers and the three-dimensional image data model. Harrington discloses the camera provide the computer with the same view that the user sees so that the synthetic image is displayed or superimpose in a manner for comfortable and convenient interaction between the real reference item within the field of view that the user may be holding and manipulating (column 4, lines 4 – 37), which reads on the claimed producing the augmented reality video by rendering the three-dimensional image data model of the product superimposed on the moving model plane in the video data. Harrington discloses the user could select as the application image a particular internet browser engine which, based upon the located orientation of the piece of paper, would be transformed to exactly match the detected orientation of the piece of paper so that the displayed image provides the illusion of the web page actually appearing on the blank piece of paper being held by the user and once the position of the paper page is determined, information can be used to correctly distort the application's image so it overlays the paper in the eyes of the user (column 5, lines 4 – 35) and the unprojection step comprises the mathematical calculation comprising taking a two-dimensional image and determining what three-dimensional object could have created that two-dimensional image with respect to what the object can be and where it could have been positioned and the subject invention utilizes known dimensions with regard to the camera system and viewing plane, in combination with assumed characteristics of the piece of paper (column 7, lines 28 – 53), which reads on the claimed

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rendering of the three-dimensional image data model has substantially the pose of the moving model plane. Harrington discloses video capture hardware that converts the analog signal from the camera into a digitized frame that can be stored in the computer and the hardware outputs a signal to the computer as a digitized and processible representation of what the user sees from the camera's field of view and the video generation hardware takes a bit map of pixel values from the computer and converts them into a television format that can be displayed on the headset and where the signal generated by the camera is different from the signal displayed on the headset by the addition of the computer-generated electronic image to thereby form a synthetic image as an augmented-reality display (column 4, lines 25 – 38), which reads on the claimed converting the augmented reality video into a streaming video format and the claimed streaming the augmented reality video having the streaming video format over a communications network to a computer for displaying the augmented reality video. Harrington did not expressly disclose encoding hyperlink information into the augmented reality video and accessing information about the corresponding product by selecting the corresponding product in the rendered three-dimensional form from the augmented reality video. Rhoads discloses watermark may carry information or programmatic action or link to external information or an action, such as retrieval and output of information stored elsewhere in a database, website, etc (column 4, lines 31 – 39) and watermark can be embedded immediately into a video object layer after a graphical model is rendered to the video object layer (column 4, lines 40 – 49) and users selecting a video object, retrieving the linked information or actions for the selected object and rendering them on its user interface (column 16, lines 16 – 38). It would have been obvious for one of ordinary skill in the art at the time of the invention to further modify Harrington's and

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Rhoads' systems by embedding hyperlink information into 3D rendered objects when selected.

One would be motivated to do so because this gives users the convenience of retrieving extra information about the selected desired object from an external source upon request.

Regarding independent claim 61 and dependent claim 50, 51, 58, and 59, claims 50, 51, 58, and 59 are similar in scope as to claim 61, thus the rejection for claim 61 hereinabove is applicable to claims 50, 51, 58, and 59.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Zhang, Z., "Flexible Camera Calibration by Viewing a Plane from Unknown

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Orientations", Proceedings of the Seventh International Conference on Computer Vision, 1999, 666-673 discloses scaling and calibration algorithm.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey J. Chow whose telephone number is (571)272-8078. The examiner can normally be reached on Monday - Friday 10:00AM - 5:00PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571)-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JJC



ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER